AMENDMENTS TO THE CLAIMS

Please amend the claims as follows.

1. (Currently Amended) A communication node comprising:

an optical signal transceiver having at least one optical signal transmitting device and at least one optical signal receiving device to transmit and receive an optical signal to and from an opposite communication node;

at least one optical signal transmitting communication line to transmit an optical signal to said opposite communication node;

at least one optical signal receiving communication line to receive an optical signal from said opposite communication node; and

a switching device including at least two bi-directional ports, said switching device being connected to said optical signal transmitting device and to said optical signal receiving device to transmit,

such that when no failure has occurred in said optical signal transmitting communication line and in said optical signal receiving communication line, an optical signal fed from said optical signal transmitting device to said optical signal transmitting communication line and to transmit an optical signal fed from said optical signal receiving communication line to said optical signal receiving device,

when a failure has occurred in said optical signal transmitting communication line, said switching ~~devices~~ device switches so that said optical signal fed from said optical signal transmitting device is transmitted via one of said at least two bi-directional ports to said

optical signal receiving communication line and,

when a failure has occurred in said optical signal receiving communication line, said switching device switches so that said optical signal to be fed to said optical signal receiving device is received via an other of said at least two bi-directional ports from said optical signal transmitting communication line.

2. (Original) The communication node according to Claim 1, wherein wavelengths of optical signals transmitted from all said optical signal transmitting devices being placed in said optical signal transceiver are different from one another and from wavelengths of optical signals transmitted from said opposite communication node.

3. (Original) The communication node according to Claim 1, wherein said switching device includes an optical switch that enables an optical signal to be transmitted in bidirectional directions.

4. (Currently Amended) A communication node comprising:

a plurality of optical signal transceivers each having at least one optical signal transmitting device and at least one optical signal receiving device, which transmit and receive an optical signal to and from an opposite communication node;

a plurality of optical signal communication lines to transmit and receive an optical signal between each of said optical signal transceivers and said opposite communication node; and

a switching device including at least two bi-directional ports, said switching device

being connected to said optical signal transmitting device and to said optical signal receiving device,

when a failure has occurred in ~~any~~ one of said plurality of said optical signal communication ~~line~~ lines, said switching device switches so that an optical signal that had been transmitted through said one of said plurality of optical signal communication ~~line~~ lines is transmitted in a multiplexed manner via one of said at least two bi-directional ports through another of said plurality of optical signal communication ~~line~~ lines.

5. (Original) The communication node according to Claim 4, wherein a wavelength of an optical signal that had been transmitted through an optical signal communication line in which a failure occurred is different from a wavelength of an optical signal that is transmitted through an optical signal communication line in which said optical signal is transmitted in a multiplexed manner when a failure occurs in said optical signal communication line.

6. (Original) The communication node according to Claim 4, wherein said switching device includes an optical switch that enables an optical signal to be transmitted in bidirectional directions.

7. (Currently Amended) A communication node being used in a ring-type network in which a plurality of said communication nodes is connected, comprising:

an optical signal transceiver having at least one optical signal transmitting device and at least one optical signal receiving device to receive an optical signal from one adjacent

communication node and to transmit said optical signal to an other adjacent communication node; and

a switching device including at least two bi-directional ports, said switching device being connected to one optical signal communication line connected to said one adjacent communication node, to an other optical signal communication line connected to said other adjacent communication node, to said optical signal transmitting device and to said optical signal receiving device, which receives,

such that when no failure has occurred in said one optical signal communication line and in said other optical signal communication line, an optical signal sent from said one adjacent communication node from said one optical signal communication line and transmits it to said optical signal receiving device and transmits an optical signal to be transferred from said optical signal transmitting device to said other adjacent communication node to said other optical signal communication line and relays an optical signal, when an optical signal fed from a communication node other than said one adjacent communication node making up said ring-type network is input from said other optical signal communication line to transfer it to said one optical signal communication line,

when the failure has occurred in said one optical signal communication line, said switching ~~devices~~ device switches so that said optical signal fed from said one adjacent communication node is received from said other optical signal communication line via one of said at least two bi-directional ports and is transmitted to said optical signal receiving device and does switching, when the failure has occurred in said other optical signal communication line, so that said optical signal to be transferred from said optical signal transmitting device to said other adjacent communication node is transmitted via an other of said at least two bi-

directional ports to said one optical signal communication line.

8. (Original) The communication node according to Claim 7, wherein wavelengths of optical signals transmitted by all communication nodes making up said ring-type network are different from one another.

9. (Original) The communication node according to Claim 7, wherein said switching device includes an optical switch that enables an optical signal to be transmitted in bidirectional directions.

10. (Currently Amended) A communication node being used in a ring-type network in which a plurality of communication nodes is connected, said communication node comprising:

an optical signal transceiver having a plurality of optical signal transmitting devices to transmit an optical signal to an adjacent communication node and a plurality of optical signal receiving devices to receive an optical signal from said adjacent communication node and to transmit and receive optical signals to and from both of said adjacent communication node;

an optical signal transmitting communication line to transmit an optical signal to said adjacent communication node;

an optical signal receiving communication line to receive an optical signal from said adjacent communication node;

a switching device including at least two bi-directional ports, said switching device being connected to one of said plurality of optical signal transmitting ~~device~~ devices and to

one of said plurality of optical signal receiving ~~device~~ devices,

such that when no failure has occurred in said optical signal transmitting communication line and in said optical signal receiving communication line, an optical signal to be transferred from said one of said plurality of optical signal transmitting ~~device~~ devices to said adjacent communication node to said optical signal transmitting communication line and receives an optical signal sent from said adjacent communication node from said optical signal receiving communication line and transmits it to said one of said plurality of optical signal receiving ~~device~~ devices,

when a failure has occurred in said optical signal transmitting communication line, said switching ~~devices~~ device switches so that an optical signal that had been transmitted from said one of said plurality of optical signal transmitting ~~device~~ devices to said optical signal transmitting communication line is transmitted via one of said at least two bi-directional ports to said optical signal receiving communication line being connected similarly to said adjacent communication node to which said optical signal transmitting communication line had been connected and does switching,

when a failure has occurred in said optical signal receiving communication line, said switching ~~devices~~ device switches so that an optical signal that had been received from said optical signal receiving communication line and had been transmitted to said one of said plurality of optical signal receiving ~~device~~ devices is received via another of said at least two bi-directional ports from an optical signal transmitting communication line being connected similarly to said adjacent communication node to which said optical signal receiving communication line had been connected.

11. (Original) The communication node according to Claim 10, wherein wavelengths of optical signals to be transmitted from said optical signal transmitting device to said adjacent communication node are different from those of optical signals fed from said adjacent communication node.

12. (Original) The communication node according to Claim 10, wherein said switching device includes an optical switch that enables an optical signal to be transmitted in bidirectional directions.

13. (Currently Amended) A switching device being connected to an optical signal transceiver comprising at least one optical signal transmitting device and at least one optical signal receiving device to transmit and receive an optical signal to and from an opposite communication node and making up a communication node with said optical signal transceiver,

said switching device <u>including at least two bi-directional ports, said switching device</u> configured to be connected to at least one piece of an optical signal transmitting communication line to transmit an optical signal to said opposite communication node, at least one piece of an optical signal receiving communication line to receive an optical signal from said opposite communication node, said optical signal transmitting device and said optical signal receiving device; and

wherein, when no failure has occurred in said optical signal transmitting communication line and in said optical signal receiving communication line, an optical signal fed from said optical signal transmitting device is transmitted to said optical signal

transmitting communication line and an optical signal fed from said optical signal receiving communication line is transmitted to said optical signal receiving device and wherein,

when a failure has occurred in said optical signal transmitting communication line, switching is done so that said optical signal fed from said optical signal transmitting device is transmitted via one of said at least two bi-directional ports to said optical signal receiving communication line and, when a failure has occurred in said optical signal receiving communication line, switching is done so that said optical signal to be fed to said optical signal receiving device is received via an other of said at least two bi-directional ports from said optical signal transmitting communication line.

14. (Original) The switching device according to Claim 13, wherein wavelengths of optical signals fed from all of said optical signal transmitting devices being placed in said optical signal transceiver are different from one another and from those of optical signals transmitted from said opposite communication node.

15. (Original) The switching device according to Claim 13, further comprising an optical switch that enables an optical signal to be transmitted in bidirectional directions.

16. (Currently Amended) A switching device being connected to a plurality of optical signal transceivers each having at least one optical signal transmitting device and at least one optical signal receiving device to transmit and receive an optical signal to and from an opposite communication node and making up a communication node with said plurality of

optical signal transceivers,

said switching device including at least one bi-directional port, said switching device configured to be connected to a plurality of optical signal communication lines to transmit and receive an optical signal between said optical signal transmitting device and said opposite communication node, each said optical signal transmitting device, and each said optical signal receiving device,

wherein switching is done, when a failure occurs in any of said optical signal communication lines, so that an optical signal that had been transmitted through said optical signal communication line in which said failure has occurred is transmitted via said at least one bi-directional port in a multiplexed manner through any other optical signal communication lines.

17. (Original) The switching device according to Claim 16, wherein wavelengths of optical signals that had been transmitted through an optical signal communication line in which a failure has occurred are different from those of optical signals that are transmitted through an optical signal communication line in which said optical signals are transmitted in a multiplexing manner when said failure has occurred in said optical signal communication line.

18. (Original) The switching device according to Claim 16, further comprising an optical switch that enables an optical signal to be transmitted in bidirectional directions.

19. (Currently Amended) A switching device being connected to an optical signal transceiver having at least one optical signal transmitting device and at least one optical signal receiving device and receiving an optical signal from one adjacent communication node and transmitting an optical signal to an other adjacent communication node and making up a communication node of a ring-type network, said switching device including at least two bi-directional ports, said switching device configured to be connected one optical signal communication line connected to said one adjacent communication node, to an other optical signal communication line connected to said other adjacent communication node, to said optical signal transmitting device and to said optical signal receiving device,

wherein, when no failure has occurred in said one optical signal communication line and in said other optical signal communication line, an optical signal fed from said one adjacent communication node is received from said one optical signal communication line and is transmitted to said optical signal receiving device and an optical signal to be transferred from said optical signal transmitting device to said other adjacent communication node is transmitted to said other optical signal communication line and, when an optical signal fed from a communication node other than said one adjacent communication node making up said ring-type network is input from said adjacent optical signal communication line, said optical signal is relayed to transfer it to said one optical signal communication line,

when a failure occurs in said one optical signal communication line, said switching ~~devices~~ device switches so that said optical signal fed from said one adjacent communication node is received through said other optical signal communication line via one of said at least two bi-directional ports and is transmitted to said optical signal receiving device and, when a failure has occurred in said other optical signal communication line, an optical signal to be

transferred from said optical signal transmitting device to said other adjacent communication node is transmitted via an other of said at least two bi-directional ports to said one optical signal communication line.

20. (Original) The switching device according to Claim 19, wherein wavelengths of optical signals to be transmitted by all communication nodes making up said ring-type network are different from one another.

21. (Original) The switching device according to Claim 19, further comprising an optical switch that enables an optical signal to be transmitted in bidirectional directions.

22. (Currently Amended) The switching device being connected to an optical signal transceiver having a plurality of optical signal transmitting devices to transmit an optical signal to adjacent communication nodes and a plurality of optical signal receiving devices to receive an optical signal from said adjacent communication nodes and to transmit and receive an optical signal to and from both of said adjacent communication nodes and making up a communication node of a ring-type network,

said switching device including at least two bi-directional ports, said switching device configured to be connected to an optical signal transmitting communication line to transmit an optical signal to said adjacent communication node, an optical signal receiving communication line to receive an optical signal from said adjacent communication node, said plurality of said optical signal transmitting devices and said plurality of said optical signal

receiving devices,

wherein when no failure has occurred in said optical signal transmitting communication line and in said optical signal receiving communication line, an optical signal to be transferred from said optical signal transmitting device to said adjacent communication node is transmitted to said optical signal transmitting communication line and an optical signal fed from said adjacent communication node is received from said optical signal receiving communication line and is transmitted to said optical signal receiving device and,

when a failure has occurred in said optical signal transmitting communication line, switching is done so that an optical signal that had been transmitted from said optical signal transmitting device to said optical signal transmitting communication line is transmitted via one of said at least two bi-directional ports to an optical signal receiving communication line being connected similarly to said adjacent communication node to which said optical signal transmitting communication line had been connected and when a failure has occurred in said optical signal receiving communication line, switching is done so that an optical signal that had been received from said optical signal receiving communication line and transmitted to said optical signal receiving device is received via an other of said at least two bi-directional ports from an optical signal transmitting communication line being connected similarly to said adjacent communication node to which said optical signal receiving communication line had been connected.

23. (Original) The switching device according to Claim 22, wherein wavelengths of optical signals to be transmitted from said optical signal transmitting device to said adjacent communication node are different from those of optical signals fed from said

adjacent communication node.

24. (Original) The switching device according to Claim 22, further comprising an optical switch that enables an optical signal to be transmitted in bidirectional directions.

25. (Previously Presented) A switching device that transmits a plurality of external optical signals through a plurality of optical signal communication lines, comprising:

a plurality of optical multiplexing and demultiplexing devices each corresponding to one of said plurality of optical signal communication lines and each device including an input and output port, wherein optical signals of different types are communicated between said input and output ports of different devices of said plurality of optical multiplexing and demultiplexing devices through one of said plurality of optical signal communication lines that corresponds to specific optical multiplexing and demultiplexing devices; and

a plurality of optical switches that correspond to and communicates one of said plurality of external optical signals between said plurality of optical signal communication lines and an input and output port of one of said specific optical multiplexing and demultiplexing devices, wherein when no failure has occurred in one of said plurality of optical signal communication lines, and when a failure has occurred in one of said plurality of optical signal communication lines, said one of said plurality of external optical signals is communicated to an input and output port of an other of said specific optical multiplexing and demultiplexing devices, and

wherein bidirectional communication are conducted through the input and output

ports.

26. (Previously Presented) The switching device according to Claim 25, wherein said input and output ports of said plurality of said optical multiplexing and demultiplexing devices transmit and receive optical signals of different wavelengths .

27. (Previously Presented) A switching device that transmits a plurality of external optical signals through a plurality of optical signal communication lines comprising:

a plurality of first optical multiplexing and demultiplexing devices each corresponding to one of said plurality of optical signal communication lines and including a first set of input and output ports and a second set of input and output ports, wherein optical signals of different types are communicated between said first set of input and output ports and said second set of input and output ports, and wherein each of said second set of input and output ports are connected to said at least one of said plurality of optical signal communication lines corresponding to each of said plurality of first optical multiplexing and demultiplexing devices;

a plurality of second optical multiplexing and demultiplexing devices each including a third set of input and output ports and a fourth set of input and output ports, wherein optical signals of different types are communicated between said third set of input and output ports and said fourth set of input and output ports, wherein each of said third set of input and output ports are connected to at least one of said plurality of external optical signals; and

an optical switch between said plurality of optical signal communication lines and said plurality of second optical multiplexing and demultiplexing devices, said optical switch

corresponding to each of said plurality of second optical multiplexing and demultiplexing devices, wherein said fourth set of input and output ports of said plurality of second optical multiplexing and demultiplexing devices corresponding to said optical switch that communicates to said first set of input and output ports of a specified one of said plurality of first optical multiplexing and demultiplexing devices when no failure has occurred in one of said plurality of optical signal communication lines corresponding to said specified one of said plurality of first optical multiplexing and demultiplexing devices, and communicates from said fourth set of input and output ports of said plurality of second optical multiplexing and demultiplexing devices to a first set of input and output ports of an other of said plurality of first optical multiplexing and demultiplexing devices when a failure has occurred in said one of said plurality of optical signal communication lines,

wherein bidirectional communications are conducted through the input and output ports.

28. (Previously Presented) The switching device according to Claim 27, wherein said first set of input and output ports of said plurality of first optical multiplexing and demultiplexing devices communicate optical signals of different wavelengths and said third set of input and output ports of said plurality of second optical multiplexing and demultiplexing devices communicate optical signals of different wavelengths .

29. (Currently Amended) A switching device connected between two optical signal communication lines making up a ring-type network for transmitting an external optical signal through said ring-type network, comprising:

two optical multiplexing and demultiplexing devices each being placed so as to correspond to each of said two optical signal communication lines and each of said two devices including a first set of input and output ports and a second set of input and output ports, wherein optical signals of different types are communicated between said first set of input and output ports and said second set of input and output ports, and wherein said two optical signal communication lines corresponding to each of said two optical multiplexing and demultiplexing devices are connected to said second set of input and output ports, wherein said first set of input and output ports are connected to one another; and

a plurality of optical switches that correspond to and communicates said external optical signal between said two optical signal communication lines and said two optical multiplexing and demultiplexing devices, wherein when no failure has occurred in one of said two optical signal communication lines connected to said two optical multiplexing and demultiplexing devices, an external optical signal corresponding to each of said optical switches is input to a first set of input and output ports of each of said two optical multiplexing and demultiplexing devices, and when a failure has occurred in said one of said two optical signal communication lines, said external optical signal is input to a first set of input and output ports of each of said two optical multiplexing and demultiplexing devices corresponding to an other one of said two optical signal communication lines,

wherein bidirectional communications are conducted through the input and output ports.

30. (Previously Presented) The switching device according to Claim 29, wherein said first set of input and output ports of said two optical multiplexing and

demultiplexing devices communicates optical signal of different wavelengths .

31. (Currently Amended) A switching device that transmits an external optical signal through a ring-type network in which a plurality of optical signal communication lines are connected between adjacent communication nodes, comprising:

a plurality of optical multiplexing and demultiplexing devices each corresponding to one of said plurality of optical signal communication lines and each device including an input and output ports, wherein optical signals of different types are communicated between said input and output ports of different devices of said plurality of optical multiplexing and demultiplexing devices through one of said plurality of optical signal communication line that corresponds to specific optical multiplexing and demultiplexing devices; and

a plurality of optical switches that correspond to and communicate ~~on~~ one of said plurality of external optical signals between said plurality of optical signal communication lines and an input and output port of one ~~es~~ of said specific optical multiplexing and demultiplexing devices when no failure has occurred in one of said plurality of optical signal communication lines, and when a failure has occurred in one of said plurality of optical signal communication lines, said one of said plurality of external optical signals is communicated to an input and output port of an other of said specific optical multiplexing and demultiplexing devices,

wherein bidirectional communications are conducted through the input and output ports.

32. (Previously Presented) The switching device according to Claim 31,

wherein said input and output ports of said plurality of said optical multiplexing and demultiplexing devices transmit and receive optical signals of different wavelengths.